UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northwest Region
7600 Sand Point Way N.E., Bldg. 1
BIN C15700
Seattle, WA 98115-0070

Refer to:
2002/00644

August 30, 2002

Mr. Dave Stalters
Chief, Environmental Division
U.S. Coast Guard
2000 Embarcadero, Suite 200
Oakland, CA 94606-5337

Re: Endangered Species Act Section 7 Formal Consultation and Magnuson-Stevens Act Essential Fish Habitat Consultation, Garibaldi Boat Basin Dredging Project, Tillamook County, Oregon.

Dear Mr. Stalters:

Enclosed is a biological opinion (Opinion) prepared by the National Marine Fisheries Service (NOAA Fisheries) pursuant to section 7 of the Endangered Species Act (ESA) for the Garibaldi Boat Basin Dredging Project, Tillamook County, Oregon. NOAA Fisheries concludes in this Opinion that the proposed action is not likely to jeopardize Oregon Coast (OC) coho salmon (*Oncorhynchus kisutch*). Pursuant to section 7 of the ESA, NOAA Fisheries has included reasonable and prudent measures with non-discretionary terms and conditions that NOAA Fisheries believes are necessary and appropriate to minimize the potential for incidental take associated with this project. This Opinion also serves as consultation on essential fish habitat (EFH) pursuant to section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act and its implementing regulations (50 CFR 600).

Please direct any questions regarding this letter to Robert Anderson of my staff in the Oregon Habitat Branch at 503.231.2226.

Sincerely,

for Michael R Crouse

D. Robert Lohn
Regional Administrator

cc: Teena Monical, COE
Colin Maclaren, ODSL

Endangered Species Act - Section 7 Consultation and Magnuson-Stevens Act Essential Fish Habitat Consultation

Biological Opinion

Garibaldi Boat Basin Dredging Project,
Tillamook River Basin,
Tillamook County, Oregon

Agency:	U.S. Coast Guard
Consultation Conducted by:	NOAA Fisheries, Northwest Region
Date Issued:	August 30, 2002
Issued by:	for Michael R Crouse D. Robert Lohn Regional Administrator

Refer to: **2002/00644**

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1. ENDANGERED SPECIES ACT

1.1 Background

On May 6, 2002, the National Marine Fisheries Service (NOAA Fisheries) received a letter from the U.S. Coast Guard (USCG) requesting consultation pursuant to the Endangered Species Act (ESA) to conduct dredging at Station Tillamook Bay, Tillamook County, Oregon. Enclosed with the letter was a project proposal describing the proposed action and potential effects that may result from project implementation. In the project proposal, the USCG determined that the proposed action was not likely to adversely affect Oregon Coast (OC) coho salmon (*Oncorhynchus kisutch)*, an ESA-listed species. On June 3, 2002, the USCG revised the determination of effect indicating that after further review the proposed action was likely to adversely affect OC coho salmon and requested formal consultation.

This biological opinion (Opinion) considers the potential effects of the proposed action on OC coho salmon, which occur in the proposed action area. OC coho salmon were listed as threatened under the ESA on August 10, 1998 (63 FR 42587) and protective regulations were issued on July 10, 2000 (65 FR 42422). The objective of this Opinion is to determine whether the proposed action is likely to jeopardize the continued existence of OC coho salmon. This consultation is conducted pursuant to section 7(a)(2) of the ESA and its implementing regulations, 50 CFR 402.

1.2 Proposed Action

The USCG has requested a 10-year permit from the U.S. Army Corps of Engineers (Corps) to conduct dredging at Station Tillamook Bay located at river mile 2.75 on the Tillamook River. The boat basin's southern limit is adjacent to the Federal Channel, but no prior dredging has occurred within the boat basin. The USCG is the lead Federal agency. The Corps would issue a permit under section 10 of the Rivers Harbors Act to the USCG for the proposed dredging.

The purpose of the proposed action is to restore safe passage depths for USCG vessels. A 2.75-acre area within the 3-acre boat basin would be dredged to a depth of -10 feet mean lower low water (MLLW) with a -2-foot over-depth (maximum depth -12 feet MLLW) using a hydraulic pipeline dredge. The current depth within the boat basin ranges from -10.2 to -6.7 feet MLLW. The multispectral habitat map submitted by the USCG indicated that eelgrass occurs within the action area, but is approximately 700 feet from the dredging prism. A maximum of 30,000 cubic yards (cy) of material (58.6% sand and 41.4% silt and clay) is proposed for dredging from the boat basin over the 10-year period. The USCG expects that dredging will be required every three to five years, with removal of 5,000 to 10,000 cy of sediment per event. Dredged materials will be disposed of at the Port of Garibaldi upland disposal site.

The proposed action will require approximately three to four days to complete per dredging event, but may be spread out from one to two weeks depending on weather and tides. All in-water work is proposed to occur during the Oregon Department of Fish and Wildlife (ODFW)-recommended in-water work window, November 1 to February 15 (ODFW 2000).

1.3 Biological Information

The timing of life history events of OC coho salmon in the Tillamook River basin is summarized in Table 1.

Table 1. OC coho salmon life history events (Weitkamp *et al.* 1995).

	J	F	M	A	M	J	J	A	S	O	N	D
RIVER ENTRY												
SPAWNING												
INTRAGRAVEL DEVELOPMENT												
JUVENILE REARING												
JUVENILE OUT-MIGRATION												

Estimated escapement of coho salmon in coastal Oregon was about 1.4 million fish in the early 1900s, with harvest of nearly 400,000 fish (Weitkamp *et al.* 1995). Abundance of wild OC coho salmon declined during the period from about 1965 to 1975 and has fluctuated at a low level since that time (Nickelson *et al.* 1992). Lichatowich (1989) concluded that production potential (based on stock-recruit models) for OC coho salmon in coastal Oregon rivers was only about 800,000 fish, and he associated this decline with a reduction of nearly 50% in habitat capacity. Current abundance of coho on the Oregon coast may be less than 5% of that in the early part of this century. Recent spawner abundance in this evolutionarily significant unit (ESU) has ranged from about 20,000 adults in 1990 to near 80,000 adults in 1996, and an estimated 47,400 adult coho in 1999 (Jacobs *et al.* 2001).

The OC coho salmon ESU is disproportionately distributed throughout its range. OC coho salmon escapements within the northern (including the Tillamook River basin) and mid-coast basins have averaged 39.8% of total escapement over the 1990-1999 period of record, while OC coho salmon escapements within the southern basins have averaged 60.2% of total escapement over the 1990-1999 period of record (Jacobs *et al.* 2001). Reasons for this high productivity are probably related to additional rearing opportunities associated with lakes in the southern basins, and the relative size of the watersheds within these respective basins (Jacobs *et al.* 2001).

Threats to naturally-reproducing OC coho salmon throughout its range are numerous and varied. Freshwater and estuarine habitat factors for decline include: Channel morphology changes, substrate changes, loss of in-stream roughness, loss of estuarine habitat, loss of wetlands, loss/degradation of riparian areas, declines in water quality (*e.g.*, elevated water temperatures, reduced dissolved oxygen, altered biological communities, toxics, elevated pH, and altered stream fertility), altered stream flows, fish passage impediments, elimination of habitat, and direct take. The major activities responsible for the decline of coho salmon in Oregon are: Logging, road building, grazing and mining activities, urbanization, stream channelization, dams, wetland loss, beaver trapping, water withdrawals, and unscreened diversions for irrigation. The OC coho salmon ESU is not at immediate danger of extinction but may become endangered in the future if present trends continue.

OC coho salmon use the action area for migration and rearing.

1.4 Evaluating Proposed Actions

The standards for determining jeopardy are set forth in section 7(a)(2) of the ESA as defined by 50 CFR 402. NOAA Fisheries must determine whether the action is likely to jeopardize the listed species. This analysis involves the initial steps of defining the biological requirements and current status of the listed species, and evaluating the relevance of the environmental baseline to the species' current status.

Subsequently, NOAA Fisheries evaluates whether the action is likely to jeopardize the listed species by determining if the species can be expected to survive with an adequate potential for recovery. In making this determination, NOAA Fisheries must consider the estimated level of mortality attributable to: (1) Collective effects of the proposed or continuing action; (2) the environmental baseline; and (3) any cumulative effects. This evaluation must take into account measures for survival and recovery specific to the listed salmonid's life stages that occur beyond the action area. If NOAA Fisheries finds that the action is likely to jeopardize the listed species, it must identify reasonable and prudent alternatives for the action.

For the proposed action, NOAA Fisheries' jeopardy analysis considers direct and indirect mortality of fish attributable to the action. NOAA Fisheries also considers the extent to which the proposed action impairs the function of essential habitat elements necessary for juvenile and adult migration, spawning, and rearing of OC coho salmon under the existing environmental baseline. NOAA Fisheries' essential fish habitat (EFH) analysis considers the effects of proposed actions on EFH and associated species and their life history stages, including cumulative effects and the magnitude of such effects.

1.4.1 Biological Requirements

The first step in the methods NOAA Fisheries uses for applying the ESA to listed salmon is to define the biological requirements of the species most relevant to each consultation. NOAA Fisheries also considers the current status of the listed species taking into account population size, trends, distribution and genetic diversity. To assess the current status of the listed species, NOAA Fisheries starts with the determinations made in its decision to list OC coho salmon for ESA protection and also considers new data available that are relevant to the determination.

The relevant biological requirements are those necessary for OC coho salmon to survive and recover to naturally reproducing population levels at which protection under the ESA would become unnecessary. Adequate population levels must safeguard the genetic diversity of the listed stock, enhance their capacity to adapt to various environmental conditions, and allow them to become self-sustaining in the natural environment.

For this consultation, the biological requirements are improved habitat characteristics that function to support successful rearing and migration. The current status of OC coho salmon, based upon their risk of extinction, has not significantly improved since the species was listed and may have worsened.

1.4.2 Environmental Baseline

The action area is defined as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area (project area) involved in the proposed action (50 CFR 402.02). The direct effects occur at the project site, and indirect effects may extend throughout Tillamook Bay based on the potential for changes in bottom topography, increase in total suspended solids, redistribution of contaminated sediments, displacement of rearing coho salmon, injury to or killing of coho salmon, and discharge of pollutants into the bay. For this consultation, the action area includes lower Tillamook Bay (river mile 2.25 to river mile 3.0) and the Port of Garibaldi upland disposal site.

Regulations implementing section 7 of the ESA (50 CFR 402.02) define the environmental baseline as the past and present impacts of all Federal, state, or private actions and other human activities in the action area. The environmental baseline also includes the anticipated effects of all proposed Federal projects in the action area that have undergone section 7 consultation, and the impacts of state and private actions that are contemporaneous with the consultation in progress.

The Tillamook Bay Comprehensive Conservation and Management Plan (TBNEP 1999) provides the following summary description of Tillamook Bay:

> "Tillamook Bay is a shallow estuary averaging only 6.6 feet deep over its 13 square miles. At low tide, about half of the Estuary bottom is exposed as intertidal sand/mud flats, presenting navigational challenges similar to those facing the first known European explorers who entered the Bay in 1797. Today, these intertidal flats provide important growing areas for oyster culture.
>
> Several deep channels, running roughly north-south, represent the geological signatures of river mouths drowned by the rising Pacific Ocean about 9,000 years ago. Boaters and fish, including salmon, depend on these channels. The ODFW rates Tillamook Bay as the State's premier recreational shellfishing area.
>
> The last ocean-bound ship left the town of Tillamook in 1912. Anxious to improve ocean-borne commerce, developers dredged and modified the main navigational channels in the Bay and river mouths. But heavy sediment loads convinced the Corps to stop

dredging the main Bay in 1913. The Corps, which last dredged the mouths of the Trask and Wilson Rivers in an attempt to control flooding in 1972, discontinued river dredging primarily due to high costs. Today only the Port of Garibaldi at the northern end of the Bay serves deepwater traffic.

Several deep channels wind through intertidal mud flats [in the estuary] that are exposed at low tide. The Bay receives fresh water from five rivers and exchanges ocean water through a single channel in the northwest corner. Despite large freshwater inflows, especially during the rainy winter months, heavy tidal fluxes dominate the system. Extreme diurnal tides can reach a range of 13.5 ft, with a mean tidal range of 5.6 ft and diurnal range of 7.5 feet. The volume of water entering the Bay due to tides has been estimated at 1.63×10^9 cubic feet (Perch *et al.* 1974).

The Bay experiences the full range of estuarine circulation patterns, from well stratified to well mixed, depending on the season and variations in river discharge. During heavy rain winter months, November through March, researchers describe a stratified system, but during low precipitation summer months, the Bay shifts to a well-mixed estuarine system (Komar 1997). Salinity ranges from around 32 ppt [parts per trillion] near the ocean entrance to around 5 ppt at the upper (southern) end of the Bay near the river mouths. Water temperature ranges from around 47-66 ^{o}F over the year. The Estuary maintains relatively high levels of dissolved oxygen (DO) throughout the year and ranges from about 6.0 ppm [parts per million] to 12.0 ppm. Except for some lowland sloughs and tributaries, eutrophication and low DO do not appear to be problems for Tillamook Bay. However the Bay experiences high levels of bacteria, especially after storms and associated agricultural and urban runoff and point source overflow.

The estuary provides habitat for numerous fish, shellfish, birds, marine mammals, and sea grasses... A 1974-1976 monthly seine and trawl survey (Bottom and Forsberg 1978) identified 59 species of fish in the Bay at various times of the year. Five species of anadromous salmonids use the estuary at some point in their life cycle. A 1996 TBNEP survey (Golden *et al.* 1998) identified 154 benthic invertebrate species. The prolific benthic community includes rich clam beds, dense areas of eelgrass, and abundant burrowing shrimp communities. Clams and Dungeness crabs continue to provide important commercial and recreational fisheries.

In the tidal and subtidal estuary, eelgrass beds provide important habitat for crabs and fish species such as salmon, herring, northern anchovy, and smelt. Although eelgrass beds show great spatial variability, the bay currently contains healthy eelgrass beds."

Lower Tillamook Bay is on the Oregon Department of Environmental Quality (ODEQ) 303(d) List of Water Quality Limited Water Bodies for temperature and bacteria.

NOAA Fisheries concludes that not all of the biological requirements of the subject species within the action area are being met under current conditions. Based on the best available information on the status of the affected species (population status, trends, and genetics, and the environmental baseline conditions within the action area), significant improvement in habitat conditions over those currently available under the environmental baseline is needed to meet the biological requirements for survival and recovery of these species.

1.5 Analysis of Effects

1.5.1 Effects of Proposed Action

1.5.1.1 Physical Habitat

The effects of dredging on physical habitat features include modification of bottom topography with resultant changes in water circulation patterns, changes to near-shore habitat structure, and a shift to coarser substrate within the dredged area. The significance of the effects is a function of the ratio of the size of the dredged area to the size of the bottom area and water volume (Morton 1977). Dredging may convert intertidal habitats to subtidal, or shallow subtidal habitats to deeper subtidal. Such conversions may affect plant and animal assemblages uniquely adapted to the particular site conditions these habitats offer. Shallow water habitat in Tillamook Bay has been greatly reduced by diking, filling, dredging, agricultural practices, urban development, and increased sediment yields caused by industrial forestry during the last century.

A pre- and post-dredging survey of an Everett, Washington, marina found higher catches of fish before dredging (Nightingale and Simenstad 2001). Catches of individuals and species declined from 89.8 fish per tow to 2.7 fish per tow and from eight species to five species. The loss of vegetated shallow-water, near-shore habitat, given the important rearing and refugia functions such habitats provide for migrating juvenile salmon and other important fishes, would represent landscape capacity loss as well as potential disruption and reduction in landscape connectivity (Nightingale and Simenstad 2001). Though the proposed action will increase boat basin depth, the depth range within the boat basin will not be appreciably altered. The current depth range is -6.7 to -10.2 feet, and dredging will increase the maximum depth to -12 feet.

The proposed dredging of 2.75 acres within the 8,320-acre area of the bay will affect bottom topography and water circulation patterns in the project area, and within approximately 150 feet of the dredging area based on the angle of repose, but is unlikely to cause large-scale or long-term effects to habitat features, such as eelgrass beds (located approximately 700 feet from the dredging limits) and near-shore habitat.

1.5.1.2 Water Quality

Dredging is likely to result in short-term (less than 96 hours) effects to OC coho salmon from increases in total suspended solids. The potential effects of exposure to elevated concentrations in total suspended solids on OC coho salmon include, but are not limited to lethal reduction in macroinvertebrate population size, reduction in feeding rates, mortality, physiological stress, and changes in behavior. Potential long-term (greater than 96 hours) effects to OC coho salmon will occur either through direct uptake (through respiration) of contaminated sediments or indirectly through food consumption. The potential effects of contaminated sediments on OC coho salmon include, but are not limited to endocrine disruption, physiological stress, impairment of essential behaviors (*e.g.*, predator avoidance, homing behavior, and spawning), reduced growth, and premature hatching.

Return water from the upland disposal site will be monitored and must meet the Oregon water quality standards the water quality certificate issued section 401 of the Clean Water Act by ODEQ. NOAA Fisheries does not expect adverse effects from the return water.

<u>Total Suspended Solids</u>
Dredging is likely to temporarily increase total suspended solids within the water column. Influences of total suspended solids and turbidity [defined as a measurement of relative clarity due to an increase in undissolved particles (suspended solids)] on fish range from advantageous to detrimental. Potential beneficial effects of temporary increases in total suspended solids includes a reduction in piscivorous fish/bird predation rates, enhanced cover conditions, and improved survival. Increases in total suspended solids have also been reported to cause physiological stress, reduce growth, reduce survival, increase water temperatures, reduce light penetration, and modify water chemistry. Of key importance in considering the detrimental effects of total suspended solids on fish are the frequency and the duration of the exposure, not just the concentration.

Salmonids have been observed to move laterally and downstream to avoid turbid plumes (McLeay *et al.* 1984, 1987; Sigler *et al.* 1984; Lloyd 1987; Scannell 1988; Servizi and Martens 1991). Juvenile salmonids tend to avoid streams that are chronically turbid, such as glacial streams or those disturbed by human activities, except when the fish must traverse these streams along migration routes (Lloyd *et al.* 1987). A potential positive of turbid waters is providing refuge and cover from predation (Gregory and Levings 1998). Fish that remain in turbid waters experience a reduction in predation from piscivorous fish and birds (Gregory and Levings 1998). In habitats with intense predation pressure, this provides a beneficial trade-off (*e.g.*, enhanced survival) to the cost of potential physical effects (*e.g.*, reduced growth).

Exposure duration is a critical determinant of the occurrence and magnitude of physical or behavioral effects (Newcombe and MacDonald 1991). Salmonids have evolved in systems that periodically experience short-term (days to weeks) pulses of high suspended sediment loads, often associated with floods, and are adapted to such exposures. Adult and larger juvenile salmonids appear to be little affected by the high concentrations of suspended sediments that occur during storm and snowmelt runoff episodes (Bjornn and Reiser 1991). However, chronic exposure can cause physiological stress that can increase maintenance energy and reduce feeding and growth (Redding *et al.* 1987, Lloyd 1987, Servizi and Martens 1991).

Turbidity, at moderate levels, has the potential to reduce primary and secondary productivity, and at high levels, has the potential to injure and kill adult and juvenile fish, and may also interfere with feeding (Spence *et al.* 1996, Bjornn and Reiser 1991). Other behavioral effects on fish, such as gill flaring and feeding changes, have been observed in response to pulses of suspended sediment (Berg and Northcote 1985). Fine redeposited sediments also have the potential to reduce primary and secondary productivity (Spence *et al.* 1996), and to reduce incubation success (Bell 1991) and cover for juvenile salmonids (Bjornn and Reiser 1991).

Increases in total suspended solids can adversely affect fish and filter-feeding macroinvertebrates. At concentrations of 53-92 ppm (24 hours) lethal reduction in macroinvertebrate population size were reported (McCabe and O'Brien 1983). Concentrations of 250 ppm (1 hour) feeding rates in juvenile coho salmon were reduced by 95% (Noggle 1978). Concentrations of 1200 ppm (96 hours) killed juvenile coho salmon (Noggle 1978). Concentrations of 53.5 ppm (12 hours) caused physiological stress and changes in behavior (Berg 1983).

The proposed dredging timing (November 1 to February 15), dredging operations period (not to exceed 10 hours per day), and methodology restraints (hydraulic dredging) are likely to minimize the adverse effects described above to listed juvenile salmonids.

<u>Contaminated Sediments</u>

The Sediment Evaluation Report submitted by the USCG included data on sediment composition, metals, total inorganic carbon, polynuclear aromatic hydrocarbons, phenols, phthalates, chlorinated hydrcarbons, pesticides, polychlorinated biphenyls (PCBs), and tributyltin. The Sediment Evaluation Report identified elevated concentrations of arsenic, copper, nickel, and PCBs, at concentrations that can cause sublethal adverse effects to adult and juvenile salmonids.

Sediment concentrations of arsenic above 7,240 parts per billion (ppb) may cause sublethal adverse effects to adult and juvenile salmonids (Buchman 1999). Sediment concentrations of arsenic in the project area are 25,000 ppb.

Sediment concentrations of copper above 18,700 ppb may cause sublethal adverse effects to juvenile and adult salmonids (Buchman 1999). Sediment concentrations of copper in the project area are 21,800 ppb.

Sediment concentrations of nickel above 15,900 ppb may cause sublethal adverse effects to juvenile and adult salmonids (Buchman 1999). Sediment concentrations of nickel in the project area are 22,700ppb.

Sediment concentrations of PCBs above 75 ppb are reasonably may cause sublethal adverse effects to juvenile and adult salmonids (NWFSC 2001). Alterations in growth and immune function have been reported in chinook salmon from estuarine sites with sediment PCB concentrations in the 400 to 500 ppb range (Arkoosh *et al.* 1991, 1998). Sediment concentrations of PCBs in the project area are 441 ppb.

1.5.1.3 Fish Entrainment

Fish may be killed, or more likely temporarily displaced, by hydraulic pipeline dredging. When juvenile salmonids come within the zone of influence of the cutter head, they may be drawn into the suction pipe (Dutta 1976, Dutta and Sookachoff 1975a). Dutta (1976) reported that salmon fry were entrained by hydraulic pipeline dredging in the Fraser River and recommended that hydraulic pipeline dredging during juvenile migration be controlled. Almost 99% of entrained juveniles were killed in studies by Braun (1974a, 1974b). Hydraulic pipeline dredging operations caused a partial destruction of the anadromous salmon fishery resource of the Fraser River (Dutta and Sookachoff 1975b). Hydraulic pipeline dredges operating in the Fraser River during fry migration took substantial numbers of juveniles (Boyd 1975). Further testing in 1980 by Arseneault (1981) found entrainment of chum and pink salmon but in low numbers relative to the total of salmonids outmigrating (0.0001 to 0.0099%).

The Corps conducted extensive sampling during hydraulic dredging within the Columbia River in 1985-88 (Larson and Moehl 1990) and again in 1997 and 1998. In the 1985-88 study no juvenile salmon were entrained, and in the 1997-98 study only two juvenile salmon were entrained. Examination of fish entrainment rates in Grays Harbor from 1978 to 1989 detected only one juvenile salmon entrained (McGraw and Armstrong 1990). Dredging was conducted outside peak migration times. No evidence of fish mortality was found while monitoring dredging activities along the Atlantic Intracoastal Waterway (Stickney 1973).

These conflicting Fraser and Columbia River studies examined deep-water areas associated with main channels. There is little information on the extent of entrainment in shallow-water areas, such as those associated with the proposed action.

In the absence of definitive information, NOAA Fisheries makes the biologically conservative assumption that hydraulic dredging in shallow-water areas is likely to entrain an unquantifiable number of juvenile salmon. The proposed dredging timing, November 1 to February 15, dredging operations limitations (not to exceed 10 hours per day), and avoidance of the area by salmon due to physical habitat disturbance, are likely to minimize the entrainment of listed juvenile coho.

1.5.1.4 Benthic Prey Resources

Dredging can disrupt benthic prey populations used by juvenile salmon if repeated dredging in the same location exceeds the recovery rate of benthic food organisms or causes a permanent shift in substrate texture or other topographic condition. Residence time of contaminated sediments in the water column and on the surface of the bay floor (where direct intake of contaminated sediments by filter-feeding invertebrates is likely) is largely unquantifiable. Significant uncertainties regarding the nutritional state of migrating juvenile salmon in relation to stability and productivity of freshwater food webs (Williams *et al.* 1966). Nonetheless, repeated dredging could delay or prevent recovery of benthic prey populations that support rearing and/or outmigrating juvenile OC coho salmon in the immediate project area.

1.5.1.5 Petrochemicals

As with all construction activities, accidental release of petrochemicals and toxic substances into the physical environment may occur. Petroleum-based contaminants (such as fuel, oil, and some hydraulic fluids) contain polycyclic aromatic hydrocarbons (PAHs) which can cause sublethal (*e.g.*, immune dysfunction), as well as lethal effects to salmonids and other aquatic organisms, depending upon concentration, duration, life-stage, and organism (Neff 1985).

The adverse effects described above will be minimized by the proposed infrequent dredging (every three to five years), the short duration (less than 96 hours per event) of dredging, methodology restraints (hydraulic dredging), upland disposal of dredged materials, the small size of the dredged area relative to the channel area, and the relative low abundance of OC coho salmon in the action area during the proposed timing of the action.

1.5.2 Cumulative Effects

Cumulative effects are defined in 50 CFR 402.02 as "those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation." Other activities within the watershed have the potential to impact fish and habitat within the action area. Future Federal actions, including the ongoing operation of hydropower systems, hatcheries, fisheries, and land management activities are being (or have been) reviewed through separate section 7 consultation processes.

Non-Federal activities within the action area are expected to increase due to a projected 34% increase in human population over the next 25 years in Oregon (ODAS 1999). Thus, NOAA Fisheries assumes that future private and state actions will continue within the action area, increasing as population density rises.

1.6 Conclusion

NOAA Fisheries used the best available scientific and commercial data to apply its jeopardy analysis, and analyzed the effects of the proposed action on the biological requirements of the species relative to the environmental baseline, together with cumulative effects. The proposed action is reasonably certain to cause short-term degradation of anadromous salmonid habitat due to increases in total suspended solids, suspension and redistribution of contaminated sediments, and a temporary loss of benthic habitat for macroinvertebrates. NOAA Fisheries does not expect the proposed action to appreciably diminish OC coho salmon survival or fitness in the action area because of the following features that are likely to minimize adverse effects to the species: The infrequent dredging (every three to five years), the short duration of dredging (less than 96 hours per event), methodology restraints (hydraulic dredging), upland disposal of dredged materials, the small size of the dredging area relative to the entire bay, and the relative low abundance of OC coho salmon in the action area during the in-water work window for the proposed action. Based on this information, NOAA Fisheries has determined that the Garibaldi Boat Basin Dredging Project is not likely to jeopardize the continued existence of OC coho salmon.

1.7 Conservation Recommendations

Section 7(a)(1) of the ESA directs Federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of threatened and endangered species. Conservation recommendations are discretionary measures suggested to minimize or avoid adverse effects of a proposed action on listed species and to develop additional information. NOAA Fisheries believes the following conservation recommendations are consistent with these obligations, and therefore should be carried out by the USCG for the Garibaldi Boat Basin Dredging Project:

1. The USCG should reassess the potential effects of contaminants from dredged materials, including sublethal effects and bioaccumulation, on fish and benthic prey species.

2. The USCG should work with the Corps to revise the Dredge Material Evaluation Framework to reflect the results of the effects reassessment in Conservation Recommendation #1 above.

3. As recommended by NOAA Fisheries' Northwest Fisheries Science Center, the USCG should determine sediment and tissue concentrations rather than pore-water concentrations when assessing contamination levels.

4. The USCG should consider the use of technological tools as suggested by Nightingale and Simenstad (2001). Technological tools such as the "Silent Inspector" should be considered whenever particularly sensitive habitats or organisms are at risk due to dredging, or in projects where sediments both suitable and unsuitable for unconfined open water disposal will be dredged adjacent to each other. This computerized electronic

sensor system can monitor hydraulic pipeline dredging operations and assist in operational documentation and regulatory compliance by providing record accessibility and clarity. It also offers advantages for planning, estimating, and managing dredging activities.

5. The USCG should provide a constructed slope no steeper than 5:1 (run:rise) to prevent sloughing of potentially contaminated sediments into dredged areas. In order for NOAA Fisheries to be kept informed of actions minimizing adverse effects, or those that benefit listed salmon and their habitats, NOAA Fisheries requests notification of any actions leading to the achievement of these conservation recommendations.

1.8 Reinitiation of Consultation

This concludes formal consultation on these actions in accordance with 50 CFR 402.14(b)(1). The USCG must reinitiate consultation if: (1) If the amount or extent of incidental take is exceeded; (2) the action is modified in a way that causes an effect on the listed species that was not previously considered in the biological assessment and this Opinion; (3) new information or project monitoring reveals effects of the action that may affect the listed species in a way not previously considered; or (4) a new species is listed or critical habitat is designated that may be affected by the action (50 CFR 402.16).

2. INCIDENTAL TAKE STATEMENT

Section 9 and rules promulgated under section 4(d) of the ESA prohibit any taking (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct) of listed species without a specific permit or exemption. "Harm" is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, and sheltering. "Harass" is defined as actions that create the likelihood of injuring listed species by annoying it to such an extent as to significantly alter normal behavior patterns which include, but are not limited to, breeding, feeding, and sheltering. "Incidental take" is take of listed animal species that results from, but is not the purpose of, the Federal agency or the applicant carrying out an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to, and not intended as part of, the agency action is not considered prohibited taking provided that such taking is in complicance with the terms and conditions of this incidental take statement.

2.1 Amount or Extent of Take

NOAA Fisheries anticipates that the proposed action covered by this Opinion is reasonably certain to result in incidental take (lethal and non-lethal) of juvenile OC coho as a result of: (1) Entrainment during hydraulic pipeline dredging; (2) increases in concentrations of total suspended solids; (3) exposure to contaminated sediments; and (4) displacement of juvenile OC coho salmon from the action area. Take in association with water quality changes is largely unquantifiable, although is reasonably certain based on the analysis in section 1.5.1.2. Take from hydraulic pipeline dredging may be either lethal or non-lethal (entrainment or displacement of juvenile OC coho from the action area). The extent of lethal and non-lethal take for this Opinion is limited to take resulting from activities undertaken as described in this Opinion that occurs in the action area (river mile 2.25 to river mile 3.0).

2.2 Reasonable and Prudent Measures

NOAA Fisheries believes the following reasonable and prudent measures are necessary and appropriate to minimize take of the above species. Minimizing the amount and extent of take is essential to avoid jeopardy to the listed species.

The USCG shall:

1. Minimize the likelihood of incidental take associated with dredging and dredged material disposal by applying permit conditions to avoid or minimize disturbance to OC coho salmon and aquatic habitats.

2. Ensure this biological opinion is meeting its objective of minimizing the likelihood of take from permitted activities through monitoring and reporting.

2.3 Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the ESA, the USCG must comply with the following terms and conditions, which implement the reasonable and prudent measures described above. These terms and conditions should be incorporated into construction contracts and subcontracts to ensure that the work is carried out in the manner prescribed. Implementation of the terms and conditions within this Opinion will further reduce the risk of adverse affects to OC coho salmon. These terms and conditions are non-discretionary.

1. To Implement Reasonable and Prudent Measure #1 (disturbance to aquatic systems), the USCG shall ensure that:
    a. In-water work.
        i. All work takes place during the ODFW-recommended in-water work period (November 1 to February 15).
        ii. No in-water work takes place outside the ODFW-recommended in-water work period without prior written authorization from NOAA Fisheries.
    b. Pollution control.
        i. A pollution control plan is developed to prevent point-source pollution related to construction operations that satisfies all pertinent requirements of Federal, state and local laws and regulations, and the requirements of these conservation measures.

ii. Return water is monitored and not discharged into any natural waterbody unless water quality meets or exceeds all provisions of the Project's National Pollution Discharge Elimination System permit.

iii. A site-specific spill prevention, containment, and control plan is developed and implemented for containment and removal of any toxicants released.

c. Refueling and hazardous materials.

i. Refueling plans include measures to prevent direct or indirect discharge of petrochemicals into Tillamook Bay.

d. Hydraulic pipeline dredging.

i. When using a hydraulic dredge, the dredge intake must be operated at or below the surface of the material being removed, but may be raised a maximum of three feet above the bay bottom for brief periods of purging or flushing. At no time shall the dredge be operated at a level higher than three feet above the bottom.

ii. No dredging shall occur within 300 feet of areas containing emergent or submerged aquatic vegetation.

2. To Implement Reasonable and Prudent Measure #2 (monitoring and reporting), the USCG shall ensure that:

a. After each dredging event, within 30 days of completing the project for each year's dredging event, the USCG will submit a monitoring report to NOAA Fisheries describing the applicant's success meeting their permit conditions. This report will include the following information:

i. Project identification.

ii. Permit number.

iii. Applicant's name.

iv. Project name.

v. Project location by 5th field hydrological unit code (HUC) and latitude and longitude.

vi. Starting and ending dates for work performed under the permit.

vii. The USCG contact person.

viii. Actual volume of dredged material removed and disposed, and the dates of and location of disposal; and

ix. A summary of the downstream extent and duration of any turbidity plume observed, and efforts made to control it.

b. The monitoring report shall be submitted to:

NOAA Fisheries
Oregon Habitat Branch
Attn: 2002/00644
525 NE Oregon Street, Suite 500
Portland, OR 97232

c. If a dead, injured, or sick endangered or threatened species specimen is located, initial notification must be made to the NOAA Fisheries Law Enforcement Office (telephone 503.325.5934). Care should be taken in handling sick or injured specimens to ensure effective treatment and care or the handling of dead specimens to preserve biological material in the best possible state for later analysis of cause of death. In conjunction with the care of sick or injured endangered and threatened species or preservation of biological materials from a dead animal, the finder has the responsibility to carry out instructions provided by Law Enforcement to ensure that evidence intrinsic to the specimen is not disturbed.

3. MAGNUSON-STEVENS ACT

3.1 Background

On, June 3, 2002, NOAA Fisheries received a letter from the USCG requesting essential fish habitat (EFH) consultation pursuant to the Magnuson-Stevens Fishery Conservation and Management Act (MSA) for the subject action. The objective of the EFH consultation is to determine whether the proposed action may adversely affect designated EFH for relevant species, and to recommend conservation measures to avoid, minimize, or otherwise offset potential adverse effects to EFH resulting from the proposed action. This consultation is undertaken pursuant to section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) and its implementing regulations (50 CFR 600).

3.2 Magnuson-Stevens Fishery Conservation and Management Act

The MSA, as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), requires the inclusion of EFH descriptions in Federal fishery management plans. In addition, the MSA requires Federal agencies to consult with NOAA Fisheries on activities that may adversely affect EFH.

EFH means those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (MSA §3). For the purpose of interpreting the definition of EFH: “Waters” include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate; “substrate” includes sediment, hard bottom, structures underlying the waters, and associated biological communities; “necessary” means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and “spawning, breeding, feeding, or growth to maturity” covers a species' full life cycle (50 CFR 600.110).

Section 305(b) of the MSA (16 U.S.C. 1855(b)) requires that:

- Federal agencies must consult with NOAA Fisheries on all actions, or proposed actions, authorized, funded, or undertaken by the agency, that may adversely affect EFH;

- NOAA Fisheries shall provide conservation recommendations for any Federal or state activity that may adversely affect EFH;

- Federal agencies shall within 30 days after receiving conservation recommendations from NOAA Fisheries provide a detailed response in writing to NOAA Fisheries regarding the conservation recommendations. The response shall include a description of measures proposed by the agency for avoiding, mitigating, or offsetting the impact of the activity on EFH. In the case of a response that is inconsistent with the conservation recommendations of NOAA Fisheries, the Federal agency shall explain its reasons for not following the recommendations.

The MSA requires consultation for all actions that may adversely affect EFH, and does not distinguish between actions within EFH and actions outside EFH. Any reasonable attempt to encourage the conservation of EFH must take into account actions that occur outside EFH, such as upstream and upslope activities, that may have an adverse effect on EFH. Therefore, EFH consultation with NOAA Fisheries is required by Federal agencies undertaking, permitting or funding activities that may adversely affect EFH, regardless of its location.

3.3 Identification of EFH

The Pacific Fisheries Management Council (PFMC) has designated EFH for three species of Pacific salmon: chinook (*Oncorhynchus tshawytscha*), coho (*O. kisutch*), and Puget Sound pink salmon (*O. gorbuscha*) (PFMC 1999). Freshwater EFH for Pacific salmon includes all those streams, lakes, ponds, wetlands, and other water bodies currently, or historically accessible to salmon in Washington, Oregon, Idaho, and California, except areas upstream of certain impassable man-made barriers (as identified by the PFMC), and longstanding, naturally-impassable barriers (*i.e.*, natural waterfalls in existence for several hundred years). Detailed descriptions and identifications of EFH for salmon are found in Appendix A to Amendment 14 to the Pacific Coast Salmon Plan (PFMC 1999). Assessment of potential adverse effects to these species' EFH from the proposed action is based on this information.

3.4 Proposed Action

The proposed action is detailed above in section 1.2 of this document. For this consultation, the action area includes lower Tillamook Bay (river mile 2.25 to river mile 3.0) and the Port of Garibaldi disposal site. The Tillamook Bay area has been designated as EFH for various life stages of chinook salmon, coho salmon, coastal pelagic, and groundfish species (Table 2).

Table 2. Species with designated EFH found in waters of the State of Oregon.

Ground Fish Species	Blue rockfish (*S. mystinus*)	Rougheye rockfish (*S. aleutianus*)	Flathead sole (*Hippoglossoides elassodon*)
Leopard shark (*Triakis semifasciata*)	Bocaccio (*S. paucispinis*)	Sharpchin rockfish (*S. zacentrus*)	Pacific sanddab (*Citharichthys sordidus*)
Soupfin shark (*Galeorhinus zyopterus*)	Brown rockfish (*S. auriculatus*)	Shortbelly rockfish (*S. jordani*)	Petrale sole (*Eopsetta jordani*)
Spiny dogfish (*Squalus acanthias*)	Canary rockfish (*S. pinniger*)	Shortraker rockfish (*S. borealis*)	Rex sole (*Glyptocephalus zachirus*)
Big skate (*Raja binoculata*)	Chilipepper (*S. goodei*)	Silvergray rockfish (*S. brevispinus*)	Rock sole (*Lepidopsetta bilineata*)
California skate (*R. inornata*)	China rockfish (*S. nebulosus*)	Speckled rockfish (*S. ovalis*)	Sand sole (*Psettichthys melanostictus*)
Longnose skate (*R. rhina*)	Copper rockfish (*S. caurinus*)	Splitnose rockfish (*S. diploproa*)	Starry flounder (*Platyichthys stellatus*)
Ratfish (*Hydrolagus colliei*)	Darkblotched rockfish (*S. crameri*)	Stripetail rockfish (*S. saxicola*)	
Pacific rattail (*Coryphaenoides acrolepsis*)	Grass rockfish (*S. rastrelliger*)	Tiger rockfish (*S. nigrocinctus*)	**Coastal Pelagic Species**
Lingcod (*Ophiodon elongatus*)	Greenspotted rockfish (*S. chlorostictus*)	Vermillion rockfish (*S. miniatus*)	Northern anchovy (*Engraulis mordax*)
Cabezon (*Scorpaenichthys marmoratus*)	Greenstriped rockfish (*S. elongatus*)	Widow Rockfish (*S. entomelas*)	Pacific sardine (*Sardinops sagax*)
Kelp greenling (*Hexagrammos decagrammus*)	Longspine thornyhead (*Sebastolobus altivelis*)	Yelloweye rockfish (*S. ruberrimus*)	Pacific mackerel (*Scomber japonicus*)
Pacific cod (*Gadus macrocephalus*)	Shortspine thornyhead (*Sebastolobus alascanus*)	Yellowmouth rockfish (*S. reedi*)	Jack mackerel (*Trachurus symmetricus*)
Pacific whiting (Hake) (*Merluccius productus*)	Pacific Ocean perch (*S. alutus*)	Yellowtail rockfish (*S. flavidus*)	Market squid (*Loligo opalescens*)
Sablefish (*Anoplopoma fimbria*)	Quillback rockfish (*S. maliger*)	Arrowtooth flounder (*Atheresthes stomias*)	
Aurora rockfish (*Sebastes aurora*)	Redbanded rockfish (*S. babcocki*)	Butter sole (*Isopsetta isolepsis*)	**Salmon**
Bank Rockfish (*S. rufus*)	Redstripe rockfish (*S. proriger*)	Curlfin sole (*Pleuronichthys decurrens*)	Coho salmon (*O. kisutch*)
Black rockfish (*S. melanops*)	Rosethorn rockfish (*S . helvomaculatus*)	Dover sole (*Microstomus pacificus*)	Chinook salmon (*O. tshawytscha*)
Blackgill rockfish (*S. melanostomus*)	Rosy rockfish (*S. rosaceus*)	English sole (*Parophrys vetulus*)	

3.5 Effects of Proposed Action

The proposed action is reasonably certain to cause short-term degradation of EFH due to increases in total suspended solids, suspension and redistribution of contaminated sediments, and temporary degradation of benthic habitat for macroinvertebeates.

3.6 Conclusion

NOAA Fisheries believes that the proposed action may adversely affect EFH for Pacific salmon, coastal pelagic, and groundfish species.

3.7 EFH Conservation Recommendations

Pursuant to section 305(b)(4)(A) of the Magnuson-Stevens Act, NOAA Fisheries is required to provide EFH conservation recommendations for any Federal or state agency action that would adversely affect EFH. The conservation recommendations outlined above in Section 1.7 and all of the reasonable and prudent measures and the terms and conditions contained in Sections 2.2 and 2.3 are applicable to Pacific salmon and ground fishes. Therefore, NOAA Fisheries incorporates each of those measures here as EFH conservation recommendations.

3.8 Statutory Response Requirement

Please note that the Magnuson-Stevens Act (section 305(b)) and 50 CFR 600.920(j) requires the Federal agency to provide a written response to NOAA Fisheries after receiving EFH conservation recommendations within 30 days of its receipt of this letter. This response must include a description of measures proposed by the agency to avoid, minimize, mitigate or offset the adverse impacts of the activity on EFH. If the response is inconsistent with a conservation recommendation from NOAA Fisheries, the agency must explain its reasons for not following the recommendation.

3.9 Supplemental Consultation

The USCG must reinitiate EFH consultation with NOAA Fisheries if either action is substantially revised or new information becomes available that affects the basis for NOAA Fisheries' EFH conservation recommendations (50 CFR 600.920).

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